

PATENT SPECIFICATION

408,756

Application Date: Dec. 23, 1932. No. 36,449/32.

(Patent of Addition to No. 373,660: dated Feb. 2, 1931.)

Complete Left: Dec. 20, 1933.

Complete Accepted: April 19, 1934.

PROVISIONAL SPECIFICATION.

Improvements in Slide Valves, such as Rotary Valves, for Internal Combustion Engines.

We, ROLAND CLAUDE CROSS, a British subject, of 33, Midford Road, Odd Down, Bath, and THE CROSS MANUFACTURING COMPANY LIMITED, a British Company, of 50, Broad Street, Bristol, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in slide valves, such as rotary valves, for internal combustion engines, and is an improvement in or modification of the invention set forth in the specification of my prior patent No. 373,660. The said prior case refers to valve assemblies for internal combustion or other engines and pumps wherein a valve element slides on a bearing surface in rotary and/or reciprocal manner and is used to control the opening and closing of a port or ports in the bearing element (e.g. rotary, piston, reciprocal and sleeve valves); an essential feature in the construction of my said prior invention is a bearing liner which is fixed in or to the valve housing and has a port or ports formed or surrounded (at the surface of said liner with which the valve coacts) by a resilient lip pressed up from said liner and having an unbroken or continuous edge. This lip tends to project into the space occupied by the valve and is normally pressed back by the valve to form a fluid-tight seal.

The object of the present invention is to keep the temperature of the resilient

lip as low as possible, and this is accomplished by shielding it to some extent from the exhaust flame whilst allowing it to project into the path of the cooling inlet gases as much as possible.

According to the present invention the exhaust port in the valve is made of smaller area than the port in the liner, whilst the inlet port in the valve is made larger. The effect aimed at is to cause the edge of the valve port to align with or overlap the lip edge, or a substantial length thereof during exhaust, whilst the edge of the other valve port is disposed back away from the lip edge to allow the latter (for all or most of its length) to project into the inlet valve port area during the suction stroke.

If the various ports are square or other polygonal formation then all the side edges or some of them may be set to produce the effect described. If circular or elliptic ports are employed the edges of the liner and valve ports respectively may be parallel or concentric when in the coincident position. The amount of overlap either of the resilient lip of the liner into the valve port area or vice versa need not necessarily be symmetrical all round the perimeter of the port.

Dated this 23rd day of December, 1932.
EDWIN C. AXE, A.I.M.E.,
27, Chancery Lane, London, W.C.2,
Agent for the Applicants.

COMPLETE SPECIFICATION.

Improvements in Slide Valves, such as Rotary Valves, for Internal Combustion Engines.

We, ROLAND CLAUDE CROSS, a British subject, of 33, Midford Road, Odd Down, Bath, and THE CROSS MANUFACTURING COMPANY LIMITED, a British Company, of 50, Broad Street, Bristol, do hereby declare the nature of this invention, and in what manner the same is to be per-

formed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an improvement in or modification of the slide valve arrangement according to Patent No. 373,660. In this main patent the lip of

the port in a liner surrounding the slide valve is upbent in the direction of the valve and is thus resiliently applied to the valve.

5 The present invention has for its object to ensure, in a valve arrangement according to the main patent, a certain amount of cooling of the liner port lip by protecting or shielding same from the
10 effect of the hot exhaust gases.

According to the invention this shielding is accomplished by causing the liner port lip to be mainly covered by the exhaust port lip in the valve body when
15 the two ports register.

The area of the exhaust port of the valve body may be smaller than the area of the liner port and the lip of the said exhaust port may project evenly inwards
20 all round over the lip of the liner port.

The cooling effect upon the liner port lip may be enhanced by causing said lip to be wholly or partly uncovered by the lip of the inlet port of the valve body
25 when these two ports register.

The area of the inlet port of the valve body may be larger than the area of the liner port in such a manner that the lip thereof is uncovered all round.

30 The inwardly projecting lip of the exhaust port deflects the hot combustion gases during the exhaust from the resilient lip of the liner port and through the uncovering of said liner port lip during
35 the intake same is exposed to the cool mixture, so that said lip on the one hand is protected from excessive heat and on the other hand is subjected to cooling.

In the attached drawing an embodiment of the invention is illustrated by way of example.

Figure 1 is a vertical sectional view of the upper part of an internal combustion engine, the rotary valve controlling the intake and exhaust being constructed
45 according to the invention;

Figure 2 is a similar fragmentary sectional view on a larger scale and show the liner port and the exhaust port in
50 register;

Figure 3 is a view similar to Figure 2, showing the liner port and the inlet port in register;

Figures 4 and 5 show details in diagrammatic representation.

The liner 1 is suitably secured in the valve casing 2 and has a port 6. In the liner 1 the rotary valve 3 is mounted in such a manner that during operation it
60 alternately connects the cylinder port 4 through its inlet port 10 and exhaust port 9 with the inlet and exhaust respectively.

According to the main patent the liner port 6 has a resilient lip 8

upturned towards the valve, whereby a satisfactory sealing for the valve is assured. In Figures 1 to 3 the bend in the lip is greatly exaggerated, in actual practice the lip is bent back
70 when the valve is fitted without leaving any clearance, so that it is powerfully applied against the valve.

According now to the invention the lip of the exhaust port 9 of the valve 3
75 covers the resilient lip 8 of the valve port (Figures 1 and 2) in such a manner that during the exhaust the hot combustion gases are deflected from the lip 8 to some extent with a view to preventing
80 undue overheating of the lip 8.

As shown in Figure 3, the lip 8 may be uncovered by the lip of the inlet port 10 of the valve 3 during the intake, whereby the lip 8 is exposed to the flow
85 of the cool mixture and is cooled thereby.

In Figures 1 to 3 the ports in the valve and in the liner are round or elliptical. These ports, however, may be of any shape, and in particular they may be rectangular as in Figures 4 and 5. In Figure 4 the exhaust port 9 is smaller than the liner port 6 and evenly projects thereabove inward all round. In Figure 5 the inlet port 10 is larger than the liner port 6 and evenly exposes the lip thereof all round. It is, however, not absolutely necessary for the exhaust port 9 to project all round evenly inwards over the liner port 6, or for the inlet port 10 to expose the liner port 6 evenly all round.
100

Obviously, the invention is applicable not only to rotary valves, but also to other types of slide valves.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—
105

1. Slide valve arrangement for internal combustion engines as claimed in the main patent specification No. 373,660, characterised in that during the exhaust the lip of the liner is mainly covered by the lip of the exhaust port of the valve.
110

2. Slide valve arrangement as in Claim 1, characterised in that the exhaust port of the valve is of smaller area than the port of the liner.
115

3. Slide valve arrangement as in Claim 1 or 2, characterised in that during the intake the inlet port of the valve mainly uncovers the lip of the port of the liner.
120

4. Slide valve arrangement as in Claim 3, characterised in that the inlet port of the valve is of larger area than the port of the liner.
125

5. A rotary valve for internal combustion engines constructed and arranged
130

substantially as herein described with
reference to the accompanying drawings.
Dated this 20th day of December, 1933.

EDWIN C. AXE, A.I.M.E.,
27, Chancery Lane, London, W.C.2,
Agent for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

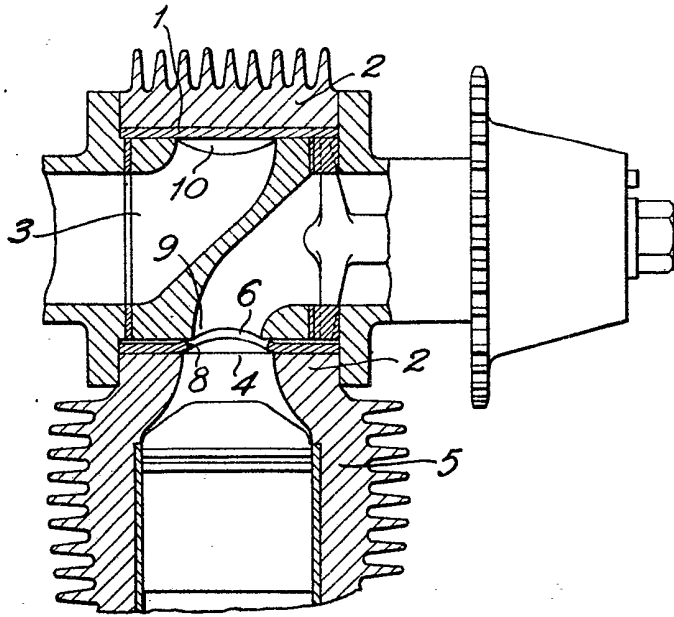


Fig. 2.

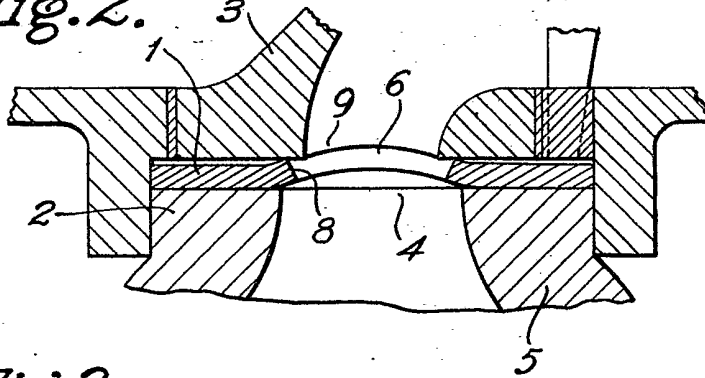


Fig. 3.

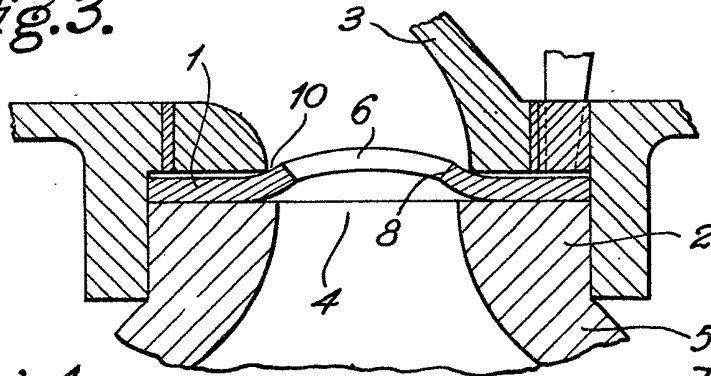


Fig. 4.

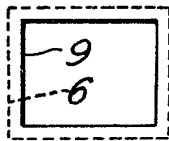


Fig. 5.

